

DISTRIBUTIONAL RECORDS FOR *NYMPHAEA LOTUS* (NYMPHAEACEAE) IN THE WESTERN HEMISPHERE¹

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ABSTRACT

Naturalized populations of *Nymphaea lotus* are reported for the first time in the Western Hemisphere. A recently discovered population in Florida is discussed and additional records of *N. lotus* in Louisiana, Guyana, Panama, Venezuela, Colombia, and Brazil are presented.

Nymphaea lotus (Linnaeus) Willdenow, a species of wide distribution in the Old World tropics, is here reported from several areas in the American tropics and subtropics. Although this species has been in cultivation in the Western Hemisphere for many years as an ornamental, these are the first naturalized populations to be reported. Conard (1905), in his monograph of the genus *Nymphaea*, placed *N. lotus* within subgenus *Lotos*, a grouping of four species native to the Old World tropics. According to Conard *N. lotus* is found throughout much of central and western Africa, Egypt, and Madagascar, and also in a few isolated populations in Hungary. However, my own herbarium and field studies of neotropical *Nymphaea* have revealed the presence of *N. lotus* in Florida, Louisiana, Guyana, Panama, Venezuela, Colombia, and Brazil as well.

My discovery of *Nymphaea lotus* in Florida occurred in March, 1980. At that time L. J. Davenport and I were in search of waterlilies of the night-flowering subgenus *Hydrocallis*, which Ward (1977) had recently reported from Florida. We had received information on populations of a *Hydrocallis* taxon in the Ft. Myers vicinity from Richard P. Wunderlin, who had just reported *N. ampla* (Salisbury) DC. from this area (Wunderlin & Les, 1980). In a moderately populated area north of Ft. Myers, we discovered *N. lotus* growing in a flowing roadside drainage canal. Numerous individual plants were observed at that time, ranging from vigorously growing and abundantly flowering adult plants to what appeared to be young seedlings.

In July of the same year we again returned to this locality to find a very dense stand of *Nymphaea lotus* extending a few hundred meters along the roadway. Stolon formation, a propagating mechanism attributed to this species by Conard (1905), may have been partially responsible for the expansion of

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this population, since stolons were observed on some individuals. Although flowers were abundant, a rather extensive search revealed only a few individuals with developing fruits, with most of these being only partially developed. Only one bee was observed in the population and no evidence was present of other insect pollinators such as beetles, which are known to pollinate other night-blooming *Nymphaea* species (Prance & Anderson, 1976; Schneider, 1979). A similar lack of insect visitation to flowers of *N. lotus* was noted by Mauve (1967) in populations of this species in South Africa, near the southern extremes of its range. Although no evidence of seed production was presented for the South African populations, the low seed set observed in the Florida population may be attributable to this lack of insect visitation.

Flowers of *Nymphaea lotus*, according to Conard (1905), are open from 7:30 p.m. to 11:00 a.m. In South Africa flowers of *N. lotus* were observed to be day-flowering (Mauve, 1967). In the Florida population flowers were just beginning to close at 11:00 a.m. EST in both March and July. Cultivated plants from this population open just after dark and remain open until 11:00 a.m. CST, as observed by Conard.

The artificial nature of the Ft. Myers drainage canal habitat strongly suggests a fairly recent introduction for *Nymphaea lotus* in Florida. Although a collection of sterile material from this population had been made in November, 1979 (Wunderlin, personal communication), no prior Florida records exist for this species. The collection had been mistakenly identified as *N. ampla*, a superficially similar species. Since the population appears to be expanding effectively via stolons and, to a lesser extent, by seed formation it seems quite possible that this species may become a permanent and perhaps more frequent constituent of the aquatic flora of Florida.

Recent work on *Nymphaea* in the southeastern United States has called my attention to specimens of *Nymphaea lotus* collected and determined by John Thieret in the mid 1960's from the parish of West Feliciana in southern Louisiana. The collections were made from a farm pond which, according to the owner's remarks as noted by Thieret, had contained the waterlilies since his purchase of the land 16 years previously—despite his efforts to eradicate them. Both white- and pink-petaled flowers were observed in this population, which doubtless originated from human introduction, indicating that a slightly different horticultural variety than the usual white-petaled form may have been involved in its initiation.

Additional work on herbarium specimens of neotropical *Nymphaea* has revealed the presence of *N. lotus* in other American countries. An interesting early collection in the Hooker Herbarium at K bears the information "Mr. Parker, Demarara." The specimen, which is clearly *N. lotus*, has no additional information, as is the case with other Parker collections of *Nymphaea* from Guyana. Biographical information indicates that C. S. Parker's Guyana collections date from 1824 (Urban, 1902) which would make this collec-

tion the earliest record of *N. lotus* in the American tropics. However, Caspary, a former authority on the taxonomy of tropical American *Nymphaea*, questioned the authenticity of this record with the Latin phrase "nu prope Demarara reperta im notist" in his annotation supplied about 1870. Caspary (1878) also omitted *N. lotus* from his subsequent treatment of South American *Nymphaea*. Conard's handwriting is absent from this specimen and he does not mention it in his monograph (Conard, 1905), although he viewed the material at K prior to this work. Interestingly, a 1945 collection from the interior of Guyana unmistakably establishes the existence of *N. lotus* in that country and lends some credibility to the earlier Parker record.

Other collections of *Nymphaea lotus* from three Panama sites in the Canal Zone region which were made in 1940, 1967 and 1972 (same site), and 1973 have been observed. The 1940 collection was erroneously cited under *N. rudgeana* G. F. W. Meyer in the Flora of Panama treatment of the Nymphaeaceae (Duke, 1962). The more recent collections indicate that *N. lotus* still persists in Panama and may even be expanding its range there. Two more collections of *N. lotus* from the state of Zulia in western Venezuela (1972, 1976), one from central Colombia (1961), and another from the south Brazilian state of Santa Catarina (1956) indicate the presence of this species in several South American countries.

Other than the disputed Parker collection from Guyana, no records of *Nymphaea lotus* from the American tropics prior to 1940 exist. However, it is not impossible that this species was present but simply overlooked by collectors until that time. Herbarium records from cultivated plants of the American tropics indicate that *N. lotus* is frequently planted as an ornamental there. Thus it seems reasonable to attribute the origin of *N. lotus* in South and Central America to local introduction through cultivation, in most cases probably within the last century, with subsequent naturalization at the sites mentioned.

Plants of *Nymphaea lotus* are distinguishable from other neotropical *Nymphaea* by several characteristics. The mature leaves are regularly spinose-dentate, very strongly peltate (pelta 2–5 cm), and usually covered with short pubescence, which is sometimes very dense, on the undersurfaces and petioles. The peduncles are often pubescent as well and project the flowers up to 20 cm above the water surface. The normally white-petaled flowers are distinctive in having very prominently veined sepals, stamens with only minute connective appendages, and long (ca 10–15 mm) linear carpellary processes. Of other species with dentate leaves, *N. ampla* is glabrous, has stamens with prominent connective appendages, and has short conical carpellary processes. *Nymphaea rudgeana* is glabrous with very irregularly undulate or dentate leaves, has sepals lacking prominent venation, and has clavate carpellary processes.

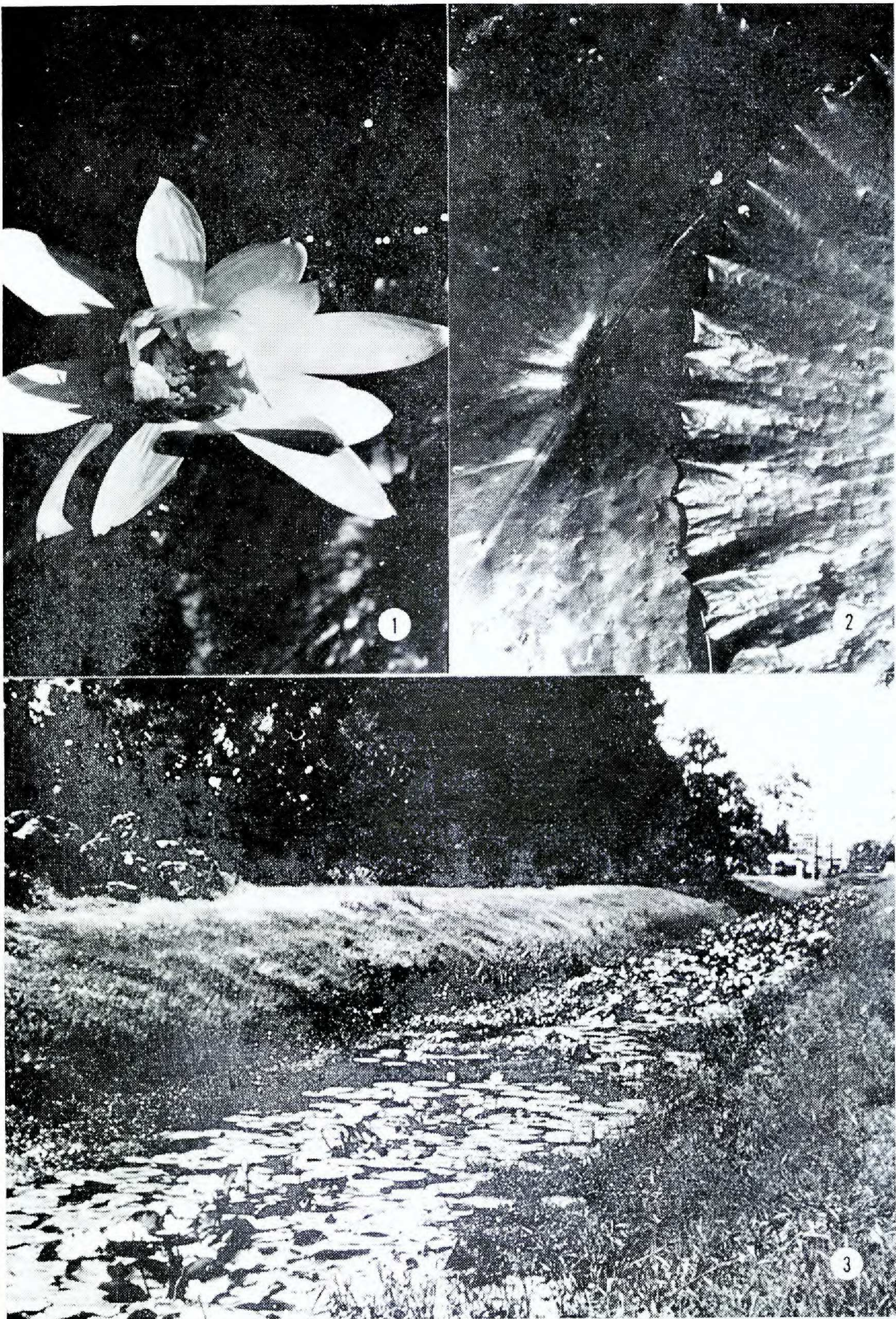


Fig. 1-3. Flower (1), leaf margin (2), and habitat (3) of North Fort Myers, Florida population of *Nymphaea lotus*.

SPECIMENS EXAMINED: FLORIDA. Lee Co.: Along Alt US 41 in North Ft. Myers, 0.3 mi N of FLA 78, 2.5 mi NW of Caloosahatchee R. bridge, T43S, R24E, S $\frac{1}{2}$ Sec 35, 14 Nov 1979, *Les* 157 (USF); 29 Mar 1980, *Wiersema* 1442 (UNA); 25 Jul 1980, *Wiersema* 1992 (UNA); 11 Oct 1980, *Beckner & Pagels* 2444 (UNA, USF); 25 Oct 1980, *Wunderlin, Beckner, & Partridge* 8847 (UNA, USF). LOUISIANA. West Feliciana Parish: 5 mi NE of St. Francisville, 16 Oct 1965, *Thieret* 21434 (LAF); 27 Oct 1967, *Thieret* 28289 (GA, LAF). GUYANA: Demarara, 1824, *Parker s.n.* (K); Mazaruni Station, Jul 1945, *Forest Department* M413 (K). PANAMA. CANAL ZONE: Madden Lake, 3–20 Aug 1940, *Woodson & Schery* 954 (MO, NY); Chagres R., ca 3 mi above Gamboa Bridge, 7 Feb 1973, *Kennedy, von Chong, & Steiner* 2300 (MO). PANAMA PROV.: Lake at Las Cumbres, 7 Jun 1967, *Duke* 11824(2) (MO); 28 Nov 1972, *Correa, Mireya, & Dressler* 1830 (MO). VENEZUELA. ZULIA: Distrito Colon, carretera Coloncito-Machiques, una hora de Coloncito hacia Machiques, Sep 1972, *Carruyo* 3 (MY); entre La Ceibita y el rio Tarro, carretera La Fria-Machiques, 10 Feb 1976, *Fernandez* 2257 (MY). COLOMBIA. CUNDINAMARCA: Plan de Fusagasuga, 26 Sep 1961, *Olivares & Bernal* 1 (COL). BRAZIL. SANTA CATARINA: Itaipava, Itajai, 1 May 1956, *Reitz & Klein* 3238 (B, US).

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REFERENCES

- CASPARY, R. 1878. Nymphaeaceae. Pages 129–184 in C. F. P. Martius and A. G. Eichler, ed. *Flora Brasiliensis*, vol. 4, part 2.
- CONARD, H. S. 1905. The waterlilies. Publ. Carnegie Inst. Wash. #4. 279 pp.
- DUKE, J. A. 1962. Nymphaeaceae. Pages 137–143 in R. F. Woodson, Jr. and R. W. Schery, *Flora of Panama*. Ann. Missouri Bot. Gard. 49.
- HOLMGREN, P. K. and W. KEUKEN. 1974. Index herbariorum, part I: The herbaria of the world, 6th ed. Oosthoek, Scheltema, and Holkema. Utrecht, Netherlands. 397 pp.
- MAUVE, A. A. 1967. Water-lilies in South Africa. *Fauna Flora (Transvaal)* 18: 31–35.
- PRANCE, G. T. and A. B. ANDERSON. 1976. Studies of the floral biology of neotropical Nymphaeaceae. *Acta Amazonica* 6: 163–170.
- SCHNEIDER, E. L. 1979. Pollination biology of the Nymphaeaceae. Proc. IVth Int. Sym. on Pollination. Maryland Agric. Exp. Sta. Special Misc. Publ. 1: 419–429.
- URBAN, I. 1902. Notae biographicae peregrinatorum Indiae occidentalis botanicorum. Pages 14–158 in I. Urban, ed. *Symbolae antillanae seu florum Indiae occidentalis*, vol. 3.
- WARD, D. B. 1977. Night-flowering waterlilies in Florida. *Florida Scientist* 40: 155–159.
- WUNDERLIN, R. P. and D. H. LES. 1980. *Nymphaea ampla* (Nymphaeaceae), a waterlily new to Florida. *Phytologia* 45: 82–84.